(12) UK Patent Application (19) GB (11) 2 195 453 (13) A

(43) Application published 7 Apr 1988

(21) Application No 8622835

(22) Date of filing 23 Sep 1986

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(51) INT CL⁴
G01N 3/08

(52) Domestic classification (Edition J):
G1S AE AQ
U1S 1769 1770 G1S

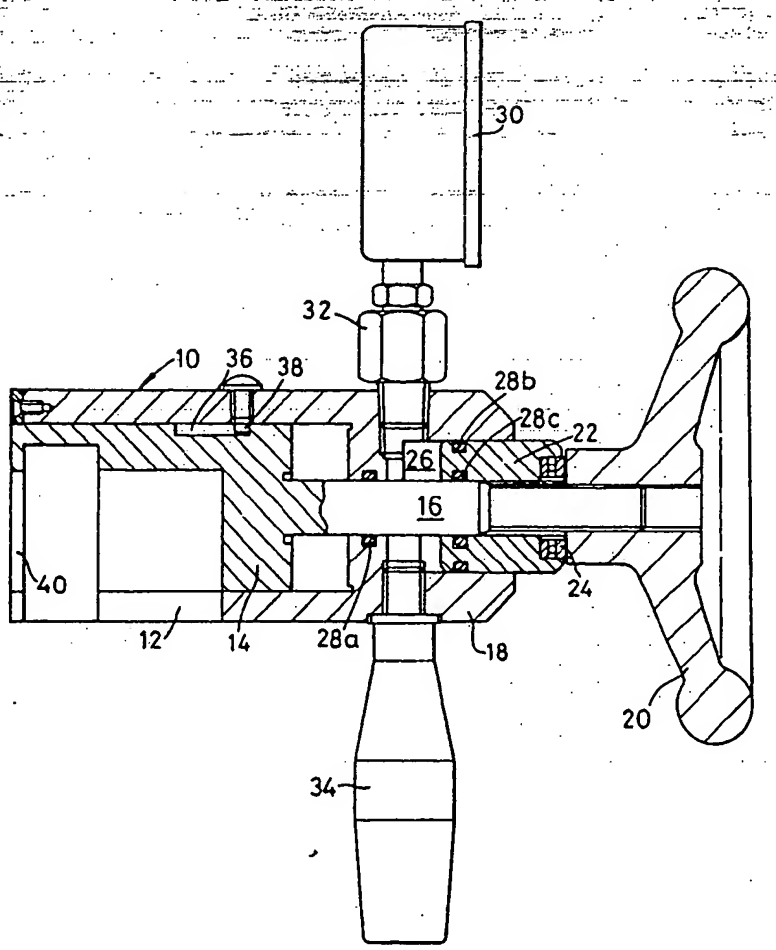
(56) Documents cited

GB A 2107476	GB 1428981	GB 0204816
GB A 2055211	GB 1379649	WO 86/01294
GB 1455534	GB 1335858	US 3563087

(58) Field of search
G1S
Selected US specifications from IPC sub-class G01N

(54) Tensile or compression test apparatus

(57) Test apparatus for loading parts of an assembly or other workpiece with a selected test force, typically a self-contained portable unit for on-site tension testing of anchor bolts, fixings, fasteners and the like, comprises a body (10) which is positioned in abutment with a wall or other structure in which the bolt or the like to be tested is secured, stressing means for example a screw element (20) acting on a shaft (16) connected to a puller formation (14) engaging the bolt or the like to apply a tensile force thereto, said force being transmitted through a body of fluid (26) in a closed chamber acted on by a piston (22) with which screw element (20) abuts, the tensile force applied being read by means of a fluid pressure gauge (30). The apparatus may be used for compression testing of materials or workpieces.



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The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy

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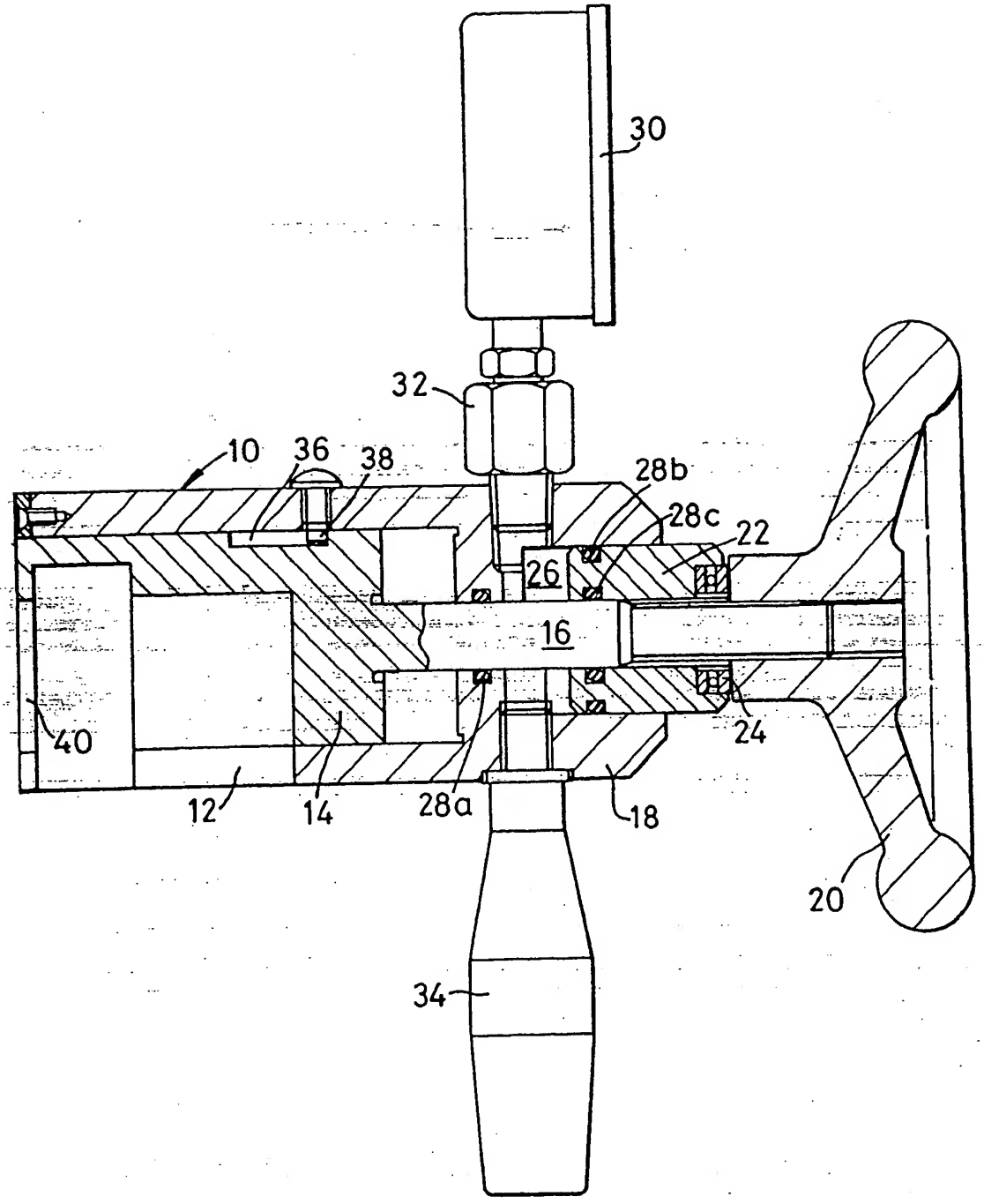

SPECIFICATION

Tensile or compression test apparatus

This invention relates to test apparatus for tensile or compression testing of an assembly, sample of material, or other workpiece particularly but not exclusively application to the on-site tensile testing of installed workpieces such as fixing or holding down bolts, anchorages and the like.

The object of the invention is to provide test apparatus which is of simple construction, easy to operate, and reliable and accurate in use and which can readily be provided in the form of a portable self-contained unit.

According to the invention there is provided test apparatus for loading an assembly or other workpiece with a selected test force including first and second relatively movable elements for engagement with respective parts of the workpiece between which said force is to be applied, stressing means operable to apply said force, and read-out means for indicating the applied loading including a variable volume chamber containing a body of fluid transmitting the reaction to said force from one said element to the other and a fluid pressure indicator responsive to the pressure in said chamber.

Conveniently the apparatus is a self-contained portable unit for on-site tension testing.

Preferably the stressing means is a manually operable mechanical drive, typically utilising a screwthreaded member acting directly on one said movable element, though various forms of lever linkages, indirectly acting screw members or the like may be employed to obtain the necessary mechanical advantage from manual operation.

An example of the invention is now more particularly described with reference to the accompanying drawing being a longitudinal sectional view of a portable self-contained apparatus for tension testing mounted anchor bolts, fixings, fasteners and the like.

The apparatus or tester is in the general form of a screw operated puller. It has a cylindrical body 10 having a cup shaped first end portion 12 which receives and guides a puller formation 14 for axial movement within the body.

Said formation is carried at one end of a shaft 16 which extends coaxially through the second end portion 18 of the body, the end portion of the shaft, which extends beyond the body, being screwthreaded to receive a handwheel 20.

The inner face of wheel 20 bears on an annular piston 22 by way of a low friction thrust bearing 24.

Piston 22 is displacable axially of a chamber 26 defined by said second end portion 18. Shaft 16 extends through the fixed inner end wall of chamber 26 through the chamber itself, and through piston 22 and the chamber is rendered fluid tight by elastomeric "O" ring or other sealing elements 28a, b, and c located in grooves in piston 22 and said inner wall.

The effective part of chamber 26 between the piston and said inner wall is variable in volume and is operatively completely filled with a body of fluid, preferably hydraulic oil.

A fluid pressure dial gauge 30 is mounted on body 10 to project laterally thereof by a union and nipple 32 which connects it to chamber 26 thus providing a direct reading of the fluid pressure therein.

To facilitate the handling of the tester and its positioning in use a handgrip 34 is provided extending laterally from body 10 on the opposite side from gauge 30.

The first end portion 12 of body 10 is open ended and is also provided with a slotted or cutaway wall portion so that it can be placed over and/or moved sideways to engage a workpiece in the form of a headed bolt, anchor or like fixing device.

The puller formation 14 may take various forms to suit the particular types of anchorage or other workpieces to be tested. In some cases interchangeable formations 14 may be provided which can be selectively connected to shaft 16 to adapt the tester to various sizes and shapes of workpiece. Typically formation 14 has a generally cylindrical outer periphery for sliding movement within end portion 12 and includes a longitudinal slot 36 which is engaged by an internally projecting key 38 on the body to prevent rotation of formation 14 and shaft 16 when handwheel 20 is turned. The outer end of formation 14 is hollowed and open to one side in alignment with the side opening in end portion 12, its extremity being in the form of a slotted plate 40 which can be engaged beneath the head of the bolt, anchorage etc to be tested.

In use, e.g. for testing an anchor bolt which has been inserted into a wall or other structure plate 40 is engaged below the head of the bolt with the end of body 10 being held in abutment with the wall surface by means of the handgrip 34. Handwheel 20 is then tightened to exert tension on the bolt in reaction against said surface. This reaction force is transmitted from the end face of handwheel 20 by way of piston 22 through the body of fluid in chamber 26 and the pressure therein which is a direct measure of the applied tensioning force is read off on gauge 30. The gauge may be provided with a secondary pointer which is displaced in one direction only so as to retain the maximum reading until it is re-zeroed. Conveniently the gauge is graduated for direct reading of the exerted force, e.g. in kiloNewtons.

Various sizes and capacities of tester may be provided, for example a range of four sizes having respective maximum test capacities of

6, 10, 16 and 20 kN.

Applications of the type of tester described above include the on-site testing of fixings and anchorages in structural work e.g. attachments to concrete, masonary etc for mounting machinas, gantries, and carrying other loadings; testing tie bolts and stays and other tension carrying members; testing welded anchors and studs; and/or the inspection or proving of screwthreads, rivets and like fasteners on machinery, vehicles, and the like.

The device is compact—a tester with a capacity for bolts or the like of up to 17mm diameter has an overall length of about 200mm, it is of simple and inexpensive construction and very simple to use, thus it can form part of the tool kit of engineers and other workers.

It is also very reliable and accurate in operation, it does not require any hydraulic pump or other ancilliary equipment and it will be noted that the pressure reading is not affected by friction in the mechanical parts such as the screwthread of the handwheel and shaft.

While the invention has been described in the form of an apparatus for tensile testing it is to be understood that it could be incorporated in apparatus adapted to compressive testing e.g. of sample materials or other workpieces, the reaction force during compression being read through the body of fluid e.g. by said body being disposed in line with the force applied by a screw jack or clamping arrangement acting on the workpiece.

CLAIMS

1. Test apparatus for loading an assembly or other workpiece with a selected test force including first and second relatively movable elements for engagement with respective parts of the workpiece between which said force is to be applied, stressing means operable to apply said force, and read-out means for indicating the applied loading including a variable volume chamber containing a body of fluid transmitting the reaction to said force from one said element to the other and a fluid pressure indicator responsive to the pressure in said chamber.

2. Apparatus as in Claim 1 in the form of a selfcontained portable unit.

3. Apparatus as in Claim 1 or 2 wherein the stressing means is a manually operable mechanical drive.

4. Apparatus as in Claim 3 wherein said mechanical drive incorporates a screw threaded member acting directly on one said movable element.

5. Apparatus as in any preceding claim adapted to apply a compressive test force to the assembly or other workpiece.

6. Apparatus as in any preceding claim adapted to apply a tensile test force to the element is a body operatively disposed in abutment with a face of one part of the assembly or other workpiece land the second element is a puller formation guided or movement relative to the body and shaped for operati engagement with another part of the assembly or other workpiece which projects from said surface to apply a tensile test force to the latter part.

8. Apparatus as in Claim 7 wherein the variable volume chamber is defined in the body and receives a piston acting on the body of fluid within the chamber; a shaft connecting the puller formation to a screw for applying a tensile force thereto passing through the chamber and piston, and said screw bearing on the piston to transmit the reaction to said force through said body of fluid to said body of the apparatus.

9. Apparatus as in Claim 7 or 8 wherein said body mounts a handgrip extending laterally therefrom to facilitate handling of the apparatus.

10. Apparatus as in Claim 8 or 8 wherein the screw is a manually rotatable element extending from the end of the body remote from the puller formation.

11. Apparatus as in any one of Claims 7 to 10 wherein interchangeable puller formations are provided for selective connection to the stressing means to engage various sizes and shapes of assembly or other workpiece parts.

12. Apparatus as in Claim 13 including a puller formation having a hollowed outer end open to one side in alignment with a side opening in the end portion of the body, the extremity of said formation being in the form of a slotted plate so permitting engagement by sideways movement with a headed bolt, anchorage or like part of the assembly or other workpiece.

13. Apparatus as in any preceding claim wherein the read-out means comprises a fluid pressure gauge mounted on the body, connected directly with the chamber, and calibrated to provide indication of the applied loading.

14. Apparatus as in Claim 13 wherein the gauge includes provision for retained indication of a maximum pressure reading.

15. Test apparatus substantially as hereinbefore described with reference to and as shown in the accompanying drawing.

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